

# 3 Results

The results of the study are presented in the following tables, figures and descriptive text. They are divided into several parts reflecting the processing of the survey, the types of responses, and a comparison with the community standards after adjustments for non-response.

## 3.1 Survey response

An important part of the study is the level of response to the survey. In order to provide sufficient confidence in the results, the response rates must be strong, the data quality high and biases minimised or eliminated.

Considerable resources were allocated to achieve satisfactory response rates. These involved a series of mail-outs and telephone reminders which prompted veterans, veterans' children (those aged 17 and over), and doctors to complete their survey forms. The follow-up procedures and response rates for veterans' conditions, children's conditions and doctors are discussed separately below.

### 3.1.1 Veterans' conditions

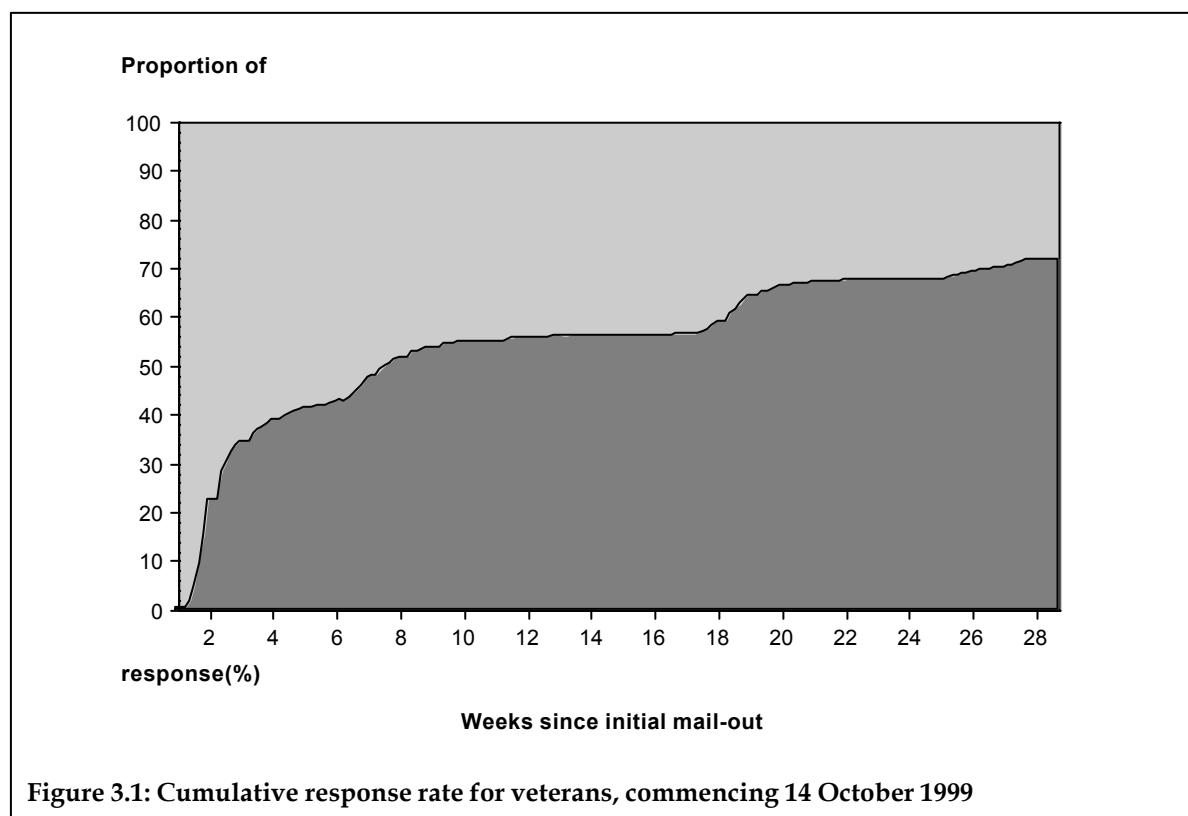
The initial mail-out of survey forms to veterans in October 1998 resulted in a response rate of 41%, which was below that needed to produce statistically reliable estimates for all conditions. Consequently, two reminder mail-outs were conducted on 23 November 1998 (Week 7) and 9 February 1999 (Week 18). These mail-outs proved successful, lifting the response rates to acceptable levels for each condition, with the exception of multiple sclerosis and motor neurone disease. To increase the response rate for these two conditions, telephone calls were made over the period 16–26 February (Weeks 19 and 20) to those veterans who had reported these conditions, but who had not responded to the Validation Study. This follow-up also proved successful, and the final response rate was 72% for all conditions combined. Within this overall response there was some variation across conditions ranging from 58% for motor neurone disease to 84% for 'other cancers'. (Table 3.1).

Figure 3.1 shows the cumulative response rate of the veterans for the return of their own forms and those for their children. The two significant increases in the response rate represent the effects of the reminder letter (Week 7) and reminder mail-out (Week 18) followed by telephone prompting (Weeks 19 and 20). The return of forms from the veterans reached a plateau in the middle of May 1999 (Week 27) at 72%, 6 months after the initial mail-out. At this time, it was thought by the Study Advisory Committee that the follow-up methods had been exhausted and the response rate was acceptable.

**Table 3.1: Response rate for veterans' specific conditions**

Condition	Number of conditions reported in Morbidity Study <sup>(a)</sup>	Number of responses received	Response rate (%)
Head and neck cancer	830	593	71.4
Lung cancer	121	79	65.3
Cancer of the colon	460	344	74.8
Soft tissue sarcoma	379	269	71.0
Melanoma	2,618	1,875	71.6
Cancer of the prostate	422	316	74.9
Male breast cancer	49	34	69.4
Cancer of the testis	148	104	70.3
Cancer of the eye	95	63	66.3
Non-Hodgkin's lymphoma	130	99	76.2
All leukaemia	67	48	71.6
Other cancers	118	99	83.9
Motor neurone disease	125	72	57.6
Multiple sclerosis	82	56	68.3
<b>Total</b>	<b>5,644</b>	<b>4,051</b>	<b>71.8</b>

(a) The number of conditions reported here are derived from the electronic version of the Morbidity Study and some vary from the published results.



**Figure 3.1: Cumulative response rate for veterans, commencing 14 October 1999**

### 3.1.2 Children's conditions

To obtain satisfactory response rates for each of the children's conditions, responses from both the veterans and their children (for those aged 17 and over) were required. For children aged 17 and over, initial consent was required from the veteran to approach his child, and then the consent of the child was needed before validation could proceed. For children under age 17, or under custodial arrangements, only the consent of the veteran was required.

Table 3.2 shows the response rates obtained for each of the children's conditions. The total number of responses against each condition includes both responses by veterans for their children under 17, and the responses of veterans' children who are over 17. The total response rate for children's conditions reported in the Morbidity Study is 70.1%.

**Table 3.2: Response rate for veterans' children's conditions**

<b>Condition</b>	<b>No. of conditions reported in Morbidity Study<sup>(a)</sup></b>	<b>Total no. of responses</b>	<b>Response rate (%)</b>
Leukaemia	78	48	61.5
Wilm's tumour	48	26	54.2
Cancer of the nervous system	121	69	57.0
Other cancer	732	628	85.8
Spina bifida	442	297	67.2
Down syndrome	145	100	69.0
Tracheo-oesophageal fistula	131	87	66.4
Anencephaly	53	41	77.4
Cleft lip/palate	308	194	63.0
Absent body part	395	273	69.1
Extra body part	355	226	63.7
Died due to accident/other	920	521	56.6
Died due to illness	901	599	66.5
Died from suicide	250	156	62.4
<b>Total</b>	<b>4,879</b>	<b>3265</b>	<b>66.9</b>

(a) The number of conditions reported here are derived from the electronic version of the Morbidity Study and some vary from the published results.

As discussed in Chapter 2, four follow-up procedures were conducted to raise the response rate for children's conditions to acceptable levels. The two reminder mail-outs sent to veterans in November 1998 and February 1999 successfully raised the veteran response rate to children's conditions. The initial response rate from children aged 17 and over was below expectations, with less than 50% responding. However, two rounds of telephone follow-up procedures raised these children's response rate to almost 85%. The overall response rates for conditions ranged between 54% and 86% (Table 3.2) and were considered satisfactory for validation purposes.

### 3.1.3 Doctors' response

Having conducted a number of follow-up procedures to successfully raise the response rates to acceptable levels for veterans' and children's conditions, it was essential that the validation study receive the support of doctors.

The initial response from doctors was below expectations with only 45% of doctors returning validation forms by the due date. To improve this response, two follow-up procedures were implemented. Firstly, reminder validation forms were sent to those doctors who had not responded. Telephone prompting was then directed at those doctors who had not responded to the reminder mail-out. Both of these follow-up procedures proved highly successful in lifting the response rate from doctors to more than 85%.

Figure 3.2 shows the cumulative response rate for the doctors, for both veteran conditions and children of veteran conditions. Doctors were initially slow in responding, but responded well to the reminder mail-out and telephone prompting.

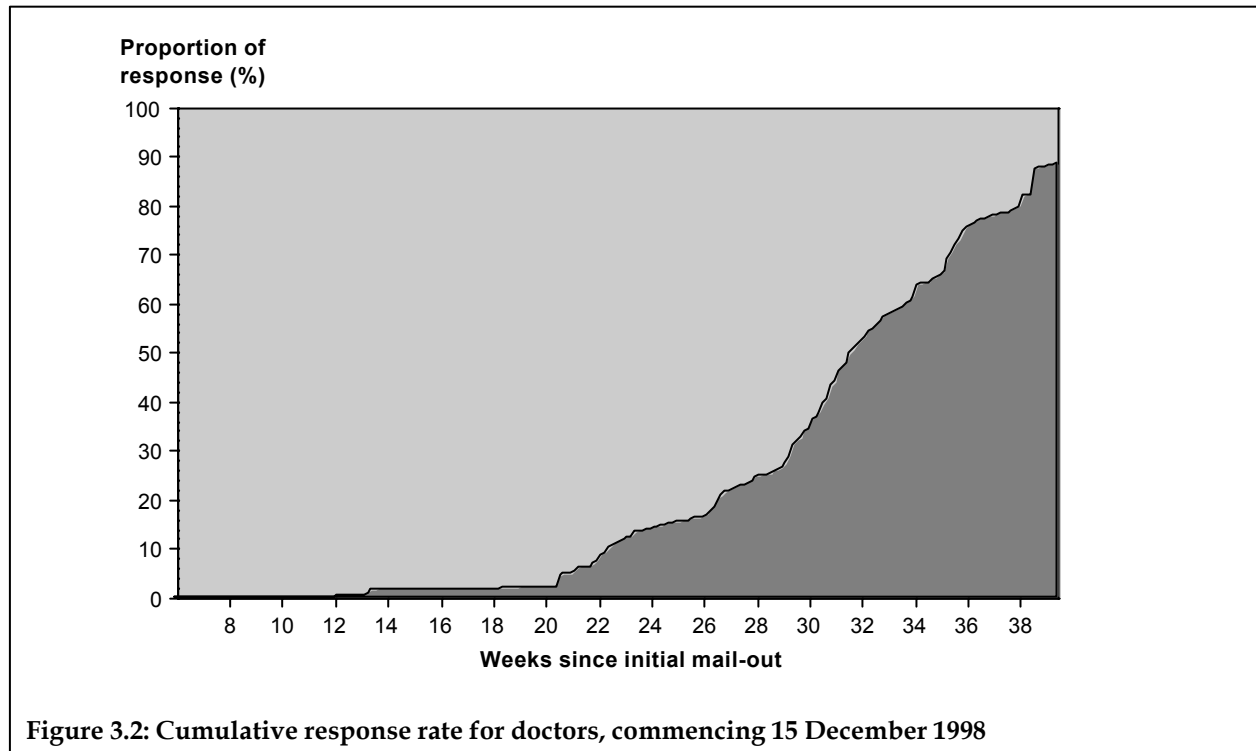


Figure 3.2: Cumulative response rate for doctors, commencing 15 December 1998

## 3.2 Validation of conditions

### 3.2.1 Veterans' conditions

The purpose of the Validation Study was to determine how many of the selected conditions identified in the Morbidity Study are valid. It is inappropriate to count only the number of valid responses to the Validation Study survey as it does not take into account the responses that were not able to be validated, among which it is expected that some valid conditions will exist. Therefore, an adjustment has been made to account for this issue in Table 3.3, and is referred to in the table as the estimated validated number of conditions. The method of adjustment is as described in section 2.3.5.

By adjusting the number of validated conditions, the estimated validated number can then be compared more confidently with the expected number of conditions based on the Australian community standard as derived in the Morbidity Study to assess whether each condition has a higher prevalence among Vietnam veterans than among the general community.

The expected number of conditions, based on the Australian community standard, includes a 95% confidence interval. For the estimated prevalence of a condition for Vietnam veterans to be considered significantly higher or lower than that for the Australian population at the 95% confidence level, the estimated prevalence should be outside the bounds of the confidence interval. The expected number of conditions based on the Australian community standard is as specified in the Morbidity Study report.

In the Morbidity Study there were no community comparisons provided for cancers of the head and neck, other cancers and total cancers. This is due to lack of compatibility between the survey question and the community comparison data (i.e. cancer registries), therefore no community comparison is possible for these groupings. In tables, a dash indicates that no community comparison is available.

A comparison of the validation estimate with the expected number of conditions, based on the Australian community standard for each condition, shows that:

- melanoma and prostate cancer have a significantly higher prevalence among the veteran population;
- colorectal cancer, lung cancer, soft tissue sarcoma, and testis cancer have a significantly lower prevalence among the veteran population; and
- all other cancers exhibit no significant difference in prevalence between the veteran population and that expected using the Australian community standard.

**Table 3.3: Number of conditions reported by veterans by validation status<sup>(a)</sup>**

Condition	No. of conditions validated	No. of conditions not validated	No. of conditions not able to be validated	No. of conditions with no response	No. of estimated validated conditions	Expected no. of conditions (confidence interval)
Head and neck cancer	132	367	107	231	160	—
Lung cancer	44	40	4	34	46	65 (49–81)
Colorectal cancer	182	160	12	107	188	221 (191–251)
Soft tissue sarcoma	10	190	71	110	14	27 (17–37)
Melanoma	423	1,241	236	732	483	380 (342–418)
Cancer of the prostate	201	105	17	101	212	147 (123–171)
Male breast cancer	2	26	6	15	2	3 (0–6)
Cancer of the testis	59	37	0	41	59	110 (89–139)
Cancer of the eye	13	41	9	32	15	11 (4–18)
Non-Hodgkin's lymphoma	57	40	9	30	62	48 (34–62)
Leukaemia	25	22	3	19	27	26 (16–36)
Other cancers <sup>(b)</sup>	48	35	6	19	51	—
<b>Total cancers</b>	<b>1,197</b>	<b>2,306</b>	<b>483</b>	<b>1,471</b>	<b>1,362</b>	<b>—</b>

(a) Extra conditions identified in the Validation Study and not in the Morbidity Study are included in this table (Section 2.3.4). They are distributed according to their validation categories

(b) Other cancers are listed by type in Appendix 17.

## Leukaemia

Leukaemia may be classified into four types. These are acute lymphatic leukaemia (ALL), chronic lymphatic leukaemia (CLL), acute myeloid leukaemia (AML) and chronic myeloid leukaemia (CML). Table 3.4 shows the number of validated leukaemias for veterans by type. CLL is the most common type of leukaemia in veterans, a finding consistent with national incidence estimates for the age group 45 to 60 years (AIHW & AACR 1998).

**Table 3.4: Number of leukaemias validated in veterans by type**

<b>Condition</b>	<b>Validated</b>
Acute lymphatic leukaemia	0
Chronic lymphatic leukaemia	16
Acute myeloid leukaemia	2
Chronic myeloid leukaemia	1
Not stated	6
<b>Total</b>	<b>25</b>

### 3.2.2 Veterans' deaths since 1997

Of the veterans who completed the Morbidity Study, 170 have since died. A full analysis of the causes of death is not possible, as ABS-coded cause of death information is not yet available for 1998 and 1999. Coded cause of death information is currently available only for 69 of the 170 veterans. Notification of death has been provided by doctors validating veterans' conditions, widows or other relatives or friends and the NDI. Causes of death for the 69 veterans, where they are available, are shown in Table 3.5.

From this table it can be seen that the majority of these deaths are due to cancers. These cancers have been included in the study as validated conditions if the validation source provided the cause of death. Lung cancer is the most common cause of death in this subset of veterans, followed by heart disease. This is not surprising as lung cancer has the highest rate of mortality of cancers and heart disease has the highest death rate for males in the 45–60 year age group (Dunn et al. (forthcoming)).

**Table 3.5: Number of veterans' deaths since completing the Morbidity Study, by cause**

<b>Cause of death</b>	<b>No. of deaths</b>
Cancer of the brain	2
Cancer of the colon	5
Cancer of the head and neck	2
Cancer of the lung	12
Cancer of the prostate	5
Cancer of the rectum	3
Other cancers	18
Cerebrovascular disease	2
Heart and circulatory system disease	8
Motor neurone disease	2
Multiple sclerosis	1
Other illnesses	9
<b>Total</b>	<b>69</b>

It is important to note that two of the veterans have died from motor neurone disease. The expected number of this condition, based on the community comparison in the Morbidity Study, is two. It seems likely that further data collected about this condition may find an excess of the condition in Vietnam veterans.

### 3.2.3 Children's conditions

Validation results for each of the children's conditions are provided in Table 3.6. As with the veterans' conditions, the estimated validated number of conditions includes an adjustment for responses that were not able to be validated.

'Extra body part' is the only children's condition that does not have a corresponding community comparison and therefore no assessment can be made of the significance of this result.

Comparisons of the estimated number of validated conditions among the children of Vietnam veterans with the expected number, based on the Australian community standard, show:

- the number of spina bifida and cleft lip/palate conditions are significantly higher than expected;
- the number of conditions relating to Wilm's tumour, Down syndrome, tracheo-oesophageal fistula, absent body parts, anencephaly and the combination of other congenital malformations exhibits no significant differences from the expected numbers of conditions; and
- the number of conditions related to cancer of the nervous system, leukaemia and a combination of all other cancers is significantly lower than expected.

**Table 3.6: Number of veterans' children's conditions by validation status<sup>(a)</sup>**

Condition	No. of conditions validated	No. of conditions not validated	No. of conditions not able to be validated	No. of conditions with no response	No. of estimated validated conditions	Expected no. of conditions (confidence interval)
Leukaemia	30	13	13	29	39	57 (42–72)
Wilm's tumour	7	15	8	22	10	7 (2–12)
Cancer of the nervous system	26	44	13	52	31	48 (34–62)
Other cancer <sup>(b)</sup>	101	309	84	266	122	333 (297–369)
Total cancer	164	381	118	369	200	—
Spina bifida—maxima	34	185	102	149	50	33 (22–44)
Down syndrome	49	27	28	43	67	92 (73–111)
Tracheo-oesophageal fistula	7	60	26	38	10	23 (14–32)
Anencephaly	10	27	10	11	13	16 (8–24)
Cleft lip/palate	57	63	77	107	94	64 (48–80)
Absent external body part	14	166	105	110	22	34 (23–45)
Extra body part <sup>(c)</sup>	38	97	129	119	74	—

(a) Extra conditions identified in the Validation Study and not in the Morbidity Study are included in this table (section 2.3.4). They are distributed according to their validation categories.

(b) Other cancers are listed by type in Appendix 18.

(c) Extra body parts are listed by type in Appendix 19.

### Leukaemia

As with the veterans, the validated leukaemias of the veterans' children were also divided into the four types of leukaemia. These are shown in Table 3.7 which shows that ALL is the most common type of leukaemia in the veterans' children. This is consistent with national incidence patterns for children up to the age of 20, after this age, AML becomes

more common (AIHW & AACR 1998). These trends are reflected in the results as the veterans' children range in age from young children to the 30–35 year age group.

**Table 3.7: Number of leukaemias validated in veterans' children by type**

Condition	Validated
Acute lymphatic leukaemia	14
Chronic lymphatic leukaemia	1
Acute myeloid leukaemia	4
Chronic myeloid leukaemia	1
Not stated	8
<b>Total</b>	<b>28</b>

### 3.2.4 Children's deaths

In the Morbidity Study, veterans reported on deaths in their children according to three categories of cause:

- accident/other
- illness
- suicide.

The Morbidity Study showed reported children's death rates above those expected based on Australian community standards in all three categories. In the validation of these reported deaths, it was found that a number of children's deaths reported in the Morbidity Study as deaths due to 'accident/other' were actually deaths due to illness. For example, deaths resulting from SIDS and various congenital anomalies were in many cases classified as 'accident/other', whereas the Australian community standard allocates these deaths to the illness category. Table 3.8 shows the results of this reclassification.

**Table 3.8: Number of deaths in veterans' children – corrected for cause of death**

Condition	Responses by cause of death reported in Morbidity Study	Responses after reclassifying to the correct cause of death
Died due to accident/other	893	790
Died due to illness	898	1,006
Died from suicide	243	238
<b>Total</b>	<b>2,034</b>	<b>2,034</b>

Validation of the children's deaths confirmed the findings from the Morbidity Study. The number of deaths for veterans' children was higher than expected, based on the Australian community standard for all three causes of death (Table 3.9).

**Table 3.9: Number of veterans' children's deaths by validation status**

Condition	Validated	Not validated	Not able to be validated	Estimated validated	Expected validated (confidence interval)
Died due to accident/other	219	43	528	660	365 (328–402)
Died due to illness	504	33	469	944	805 (749–861)
Died from suicide	111	4	123	230	75 (58–92)
<b>Total</b>	<b>834</b>	<b>80</b>	<b>1,120</b>	<b>1,834</b>	<b>—</b>



Suicide shows the most substantial difference, with the number of veterans' children committing suicide 3 times as high as expected based on the Australian community standard. Deaths from accident/other causes were approximately 1.6 times as high as expected based on the Australian community standard, and deaths from illness were 1.1 times higher than expected.

### 3.2.5 'New conditions' and 'new veterans'

As mentioned in Chapter 2, 'new conditions' refer to those conditions reported by veterans to have occurred between the Morbidity Study and the Validation Study. New veterans are those who did not participate in the Morbidity Study, but sought to participate in the Validation Study. The conditions reported by new veterans and their children, and those diagnosed after the Morbidity Study in 1997, were not included in the results above as they would have introduced a selection bias. Instead, their conditions are provided in the following tables, for veterans and their children respectively.

Melanoma of the skin, cancer of the colon and cancer of the head and neck are the most common conditions reported by veterans to have occurred since the Morbidity Study. New veterans have reported a range of the different cancers, most of which have fallen in the 'other cancers' category (Table 3.10). Since the Morbidity Study, the most common conditions in the veterans' children are deaths due to accidents with new veterans reporting deaths from accident and suicides in their children (Table 3.11).

**Table 3.10: New conditions and new veterans**

<b>Condition</b>	<b>No. of new conditions<sup>(a)</sup> validated</b>	<b>No. of new conditions<sup>(a)</sup> not validated and not yet validated</b>	<b>No. of conditions of new veterans<sup>(b)</sup> validated</b>	<b>No. of new conditions of new veterans<sup>(b)</sup> not validated and not yet validated</b>
Head and neck cancer	2	6	0	0
Lung cancer	0	1	0	0
Cancer of the colon	3	0	3	0
Soft tissue sarcoma	0	1	0	0
Melanoma	6	8	1	1
Cancer of the prostate	0	2	0	0
Male breast cancer	0	0	0	0
Cancer of the testis	0	0	0	0
Cancer of the eye	0	0	0	0
Non-Hodgkin's lymphoma	0	2	0	1
Leukaemia	1	1	0	0
Other cancers	4	2	3	2
Motor neurone disease	0	1	0	5
Multiple sclerosis	0	1	0	6
<b>Total</b>	<b>16</b>	<b>25</b>	<b>7</b>	<b>11</b>

(a) Condition relates to a veteran included in the Morbidity Study, but diagnosed after the Morbidity Study.

(b) Condition relates to a veteran not participating in the Morbidity Study.

**Table 3.11: Number of conditions in children – new conditions and new veterans**

<b>Condition</b>	<b>No. of new conditions<sup>(a)</sup> validated</b>	<b>No. of new condition<sup>(a)</sup> not validated and not yet validated</b>	<b>No. of conditions of new veteran<sup>(b)</sup> validated</b>	<b>No. of conditions of new veteran<sup>(b)</sup> not validated and not yet validated</b>
Leukaemia	1	0	2	1
Wilm's tumour	0	0	0	0
Cancer of the nervous system	1	0	0	1
Other cancer	1	3	1	0
Total cancer	0	6	0	5
Spina bifida—maxima	4	4	2	1
Down syndrome	0	0	1	0
Tracheo-oesophageal fistula	0	0	0	0
Anencephaly	0	0	0	0
Cleft lip/palate	0	0	1	0
Absent body part	1	1	0	0
Extra body part	0	2	0	2
Died due to accident/other	2	3	2	20
Died due to illness	7	21	3	13
Died from suicide	1	0	0	7
<b>Total</b>	<b>18</b>	<b>40</b>	<b>12</b>	<b>50</b>

(a) Condition relates to a child of a veteran included in the Morbidity Study, but diagnosed after the Morbidity Study.

(b) Condition relates to a child of a veteran not participating in the Morbidity Study.